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PROJECT DESCRIPTION AND AIR
EMISSION ESTIMATE FOR PONDCRETE
PROCESSING AND REPROCESSING
AT ROCKY FLATS PLANT

For Submittal To

ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
Denver, Colorado

Prepared For

UNITED STATES DEPARTMENT OF ENERGY
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SECTION 1

INTRODUCTION

The five Solar Evaporation Ponds are configured as a series of ponds shown in Figure 1, Pond 207A, Pond 207B North, Pond 207B Center, Pond 207B South, and Pond 207C. The ponds, which were placed into service in August 1956, cover a total of 6.5 acres and were used to receive, store, and treat liquid process wastes having less than 100,000 picocuries (pCi) per liter (l) of total long-lived alpha activity. The ponds are known to have received wastes including sludge, high levels of nitrates, chlorides, and various metal ions. Pond 207C stores low-level radioactive liquid process waste for evaporation, treatment, and solidification. Ponds 207B North, Center, and South primarily store groundwater intercepted by the Interceptor trench and French drain system located north of the solar ponds.

The solar evaporation ponds were originally intended to store and treat (by evaporation) low-level radioactive process wastes that had high nitrate concentrations and treated acidic wastes containing aluminum hydroxide. The ponds have also received other wastes such as sanitary sewage sludge, lithium metal, sodium nitrate, ferric chloride, lithium chloride, sulfuric acid, ammonium persulfate, hydrochloric acid, nitric acid, hexavalent chromium, and cyanide solutions. Solvents and other organics have not been discharged to the ponds on a routine basis.

In 1977, all of the 207B ponds were cleaned of sludge that was disposed of offsite. Since 1977, these ponds have held treated sanitary effluent, treated water from the Reverse Osmosis (RO) facility, backwash from the RO facility, and contaminated groundwater pumped to the solar ponds from the French drain system that intercepts approximately 4 million gallons of groundwater per year. Intercepted water is pumped to Pond 207B North and is periodically transferred to solar ponds 207B Center and 207B South. Pond 207C still contains process waste materials from Rocky Flats Plant (RFP) operations. The five solar ponds presently hold approximately 5 million gallons of liquid. Table 1.1 gives the approximate surface area for each pond in terms of square feet (ft²).

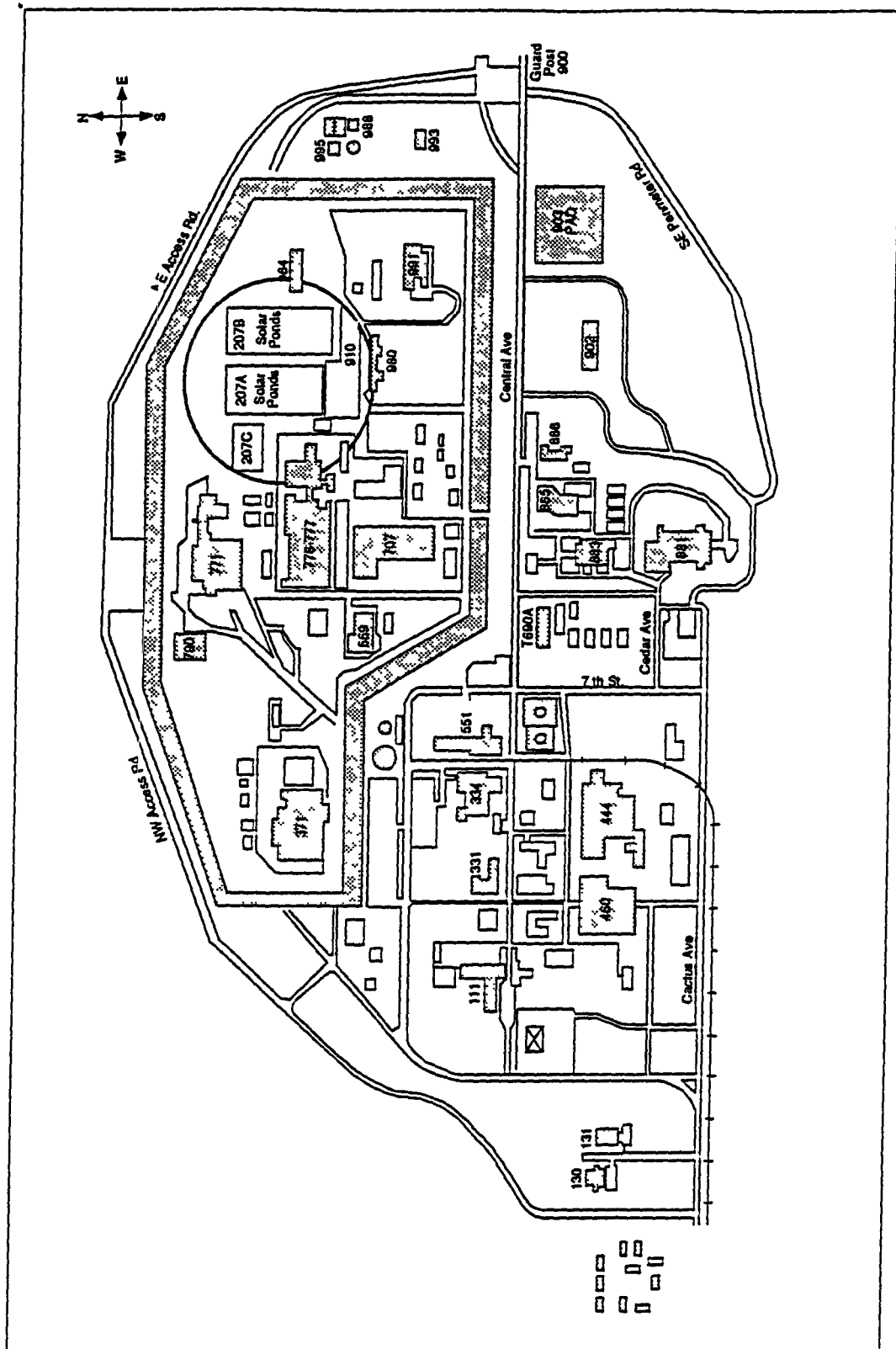


Figure 1

Rocky Flats Plant Map

TABLE 1.1
Approximate Solar Pond Surface Areas and Volumes

<u>Location</u>	<u>Surface Area, Acres</u>	<u>Surface Area, ft²</u>	<u>Liquid Volume, gallons</u>
Pond 207A	2 15	880,640	empty
Pond 207B North	0 89	364,544	1 24E06
Pond 207 B Center	0 92	376,832	1 39E06
Pond 207B South	0 88	360,448	1 12E06
Pond 207C	0 77	315,392	5 20E05
TOTAL			4 96E06

Sludges and Sediments

The schedule in the closure plan includes removal and treatment of the sediments followed by disposal offsite. The clean-out process will remove and treat the total contents of the ponds. The amount of pond waste requiring processing at the start of the clean-out may vary depending on evaporation, precipitation, and potential operational constraints.

The majority of pond sediments originated from soils in the berm areas, wind suspension, and surface water runoff. Sludge is not evaporated to dryness but is treated as a slurry. As the sludges were removed (prior operations), they were mixed with cement and solidified into "Pondcrete." The formulation consisted of Portland Type I cement. Since the production of pondcrete, some of the billets require reprocessing and repackaging to comply with offsite transportation and disposal requirements. This is the subject matter of Section 4 of this project description.

SECTION 2

207C/CLARIFIER PONDCRETE

Pond 207C as a whole can be considered to be a concentrated brine solution with silt and salt crystals at the bottom. The salts are predominantly nitrates, but some sulfates, chlorides, phosphates, and carbonates have been detected. Leachates of the Toxicity Characteristic Leaching Procedure (TCLP) on the 207C solids had concentrations of cadmium that would classify the sludge as a Resource Conservation Recovery Act (RCRA) waste based on the characteristic of toxicity.

Remediation Plan

The plan for remediation and stabilization of the mixed waste brine solution and associated solids in the Pond 207C and clarifier tank at the RFP consists of a number of sequenced preparation and processing steps. The basic operation for the formation of the pondcrete billets will be the same as previously used. However, new equipment is being purchased for better mixing, control, and documentation of the mixture contents.

The estimated schedule for start up and completion for the formation of pondcrete is as follows: construction has begun but is on hold until April 1994, testing begins April 1994 and completed by July 1994, waste processing begins July 1994 and ends October 1994, and decontamination/dismantling to start October 1994 and completed April 1995. This baseline schedule is currently under review and is likely to change. Waste processing operations will take place in close proximity to the 750 pad.

The pondcrete operation will be as follows: the sludge and brine will be pumped to holding tanks where the sludge mixture will be analyzed for particulate matter. After homogenization the sludge/brine mixture is pumped into a cement mixer where pozzolan materials consisting of Portland Type V cement, Type C fly ash, and hydrated lime are added to the sludge in a ratio of 1 02/2 0/0 075, respectively. The pozzolan to water ratio when added to the sludge is 0.42 to 1. Next, the fluid slurry is pumped into a sealed bladder liner within the half crate box while displacing the air through a vent tube into a High Efficiency Particulate Air (HEPA) filtration system. Pumping continues until the bladder is full or the weight limit of the half crate container is achieved. When the discharge valve is closed the bladder is evacuated to remove excess air and sealed.

Operating Capacity

The nominal design operating rate for the process is approximately 18 tons per hour of stabilized waste product. This is equivalent to approximately 8 half crates per hour, each containing 4,350 pounds of stabilized waste. At this production rate, 1 half crate will be filled every 6-7 minutes. Each 4,000 gallon batch of waste slurry would take approximately 4 hours to process at this rate. This would result in approximately 30-32 half crates being produced from each 4,000 gallon batch.

The casting and handling systems have been designed with a capacity of up to 12 half crates per hour. Therefore, a contingency capacity is provided over the expected nominal processing rate of 8 half crates per hour.

Emission Controls

Passive (non-forced) HEPA filters are installed on all tank vents for filtration when air or volumetric displacement occurs. In addition, active (forced draft) HEPA filters are installed on the mixer chambers to create a partial vacuum to ensure isolation from the atmosphere. HEPA filters are all single stage.

SECTION 3

207A AND 207B PONDCRETE

In preparation for closure, the contents of Pond 207A have been pumped into the three 207B Ponds. The next phase of pumping is to consolidate and concentrate the slurries into Pond 207B-South. Pond slurry will be reclaimed from the 207B South pond and transferred to the Scalping Screen/Screen Undersize Sump to remove oversize particles (10 mesh and larger). This transferring and mixing gives a homogeneous solution for processing.

Radioactive Concentration

The gross alpha and gross beta for the 207A and B-series Pond water is very low at a maximum concentration of 3,000 pCi/l. The gross alpha and gross beta for the 207B-series Pond sludges is also very low, ranging from 5 to 61 pCi/gram (g). The 207A Pond sludges gross alpha and gross beta are 570 and 95 pCi/g, respectively. The 207A and B-series Ponds were determined to be physically and chemically similar in nature, and fall under similar regulatory considerations. Therefore, the 207A and B-series ponds have been consolidated to create a single waste form.

Remediation Plan

The formation of pondcrete from the 207B ponds will be done in a manner similar to that for the 207C pond and clarifier tank discussed earlier in this application. The same type of process train and equipment will be utilized.

The estimated schedule for start up and completion for the production of pondcrete are as follows: construction to begin April 1994 and completion by April 1995, testing begins in April 1995 and completion by July 1995, waste processing is to commence in July 1995 and be completed by October 1995, and dismantling to start October 1995 and be finished by April 1996. Due to site restraints, waste processing of 207A and B ponds cannot commence until after the completion of operations for the 207C/clarifier pondcrete operations. This is an estimated schedule and should delays occur in Pond 207C waste processing, delays will be incurred in Pond 207A and B waste processing. Waste processing operations will take place south of the 207A and B ponds.

Operating Capacity

The nominal design operating rate for the process is approximately 7.5 tons per hour of stabilized waste product. The current production schedule is based on a rate of 4 half crates per hour, 12 operating hours in a double shift mode, or 48 half crates per day. The half crate handling system is designed to handle 6 half crates per hour. This rate reflects the carrying capacity of the Half Crate Handling System and not the throughput of the processing train.

Emission Controls

The casting station is equipped with an Air-Suction System that captures any potential fugitive emissions from the half crate or pouring spout. This negative pressure system is vented through HEPA filtration before discharge. The key elements of the environmental controls incorporated in the design are the following:

- The Scalping Screens for oversize removal are sealed and vented.

- All tankage and piping systems from the reclaim operations to the filling of the half crate waste containers are enclosed or covered.

- Passive single stage HEPA filters are installed on all tank exhausts for filtration when volumetric air displacement occurs.

- Active single stage HEPA filters are installed in the Mixer Chambers and the Casting Station Module to create a partial vacuum that ensures isolation from the atmosphere.

- All bulk storage tanks, fuel storage tanks, fuel off-loading systems, generators, air compressors, diesel-powered hydraulic systems, etc. are equipped with the appropriate secondary containments and vent systems.

The mixer will be contained within a negative air enclosure with HEPA filtration. An airlock and step-off pad will be incorporated to allow decontamination and radiological surveillance.

SECTION 4

REPROCESSING PONDCRETE AND SALTCRETE

In June 1985, remediation of the sludge contained in Pond 207A commenced. Pond 207A is the largest of five solar evaporation ponds which were used to treat and store much of the waste water generated at the RFP.

The remediation process at that time consisted of pumping the clear decant water on top of the pond sediments/sludge to Building 374 for evaporation and treatment. The remaining sludge was then slurred and pumped into a Clarifier at the Pondcrete Processing Facility at Building 788 for further dewatering and thickening. The thickened sludge was then pumped intermittently to a pug mill for blending with Portland Type I cement for stabilization. The resultant material, Pondcrete, was cast into lined cardboard boxes, which are referred to as tri-wall containers. The Pondcrete was allowed to solidify in the tri-wall containers and then prepared for offsite shipment to permanent storage (Rockwell International, 1989).

The Pondcrete produced was routinely disposed of at the Nevada Test Site (NTS) until the fall of 1986 when the Pondcrete was identified as low-level mixed waste. From 1986 until May 1988, a total of approximately 18,000 Pondcrete tri-walls were produced. These Pondcrete tri-walls were subsequently stored outside under tarpaulins on two storage pads (904 Pad and 750 Pad) while awaiting shipment to permanent storage.

In late May 1988, site operations personnel discovered that several of the Pondcrete tri-walls had deformed. This was, in part, due to weather exposure and also due to the incomplete hardening and solidification of the Pondcrete product which made the tri-wall containers vulnerable when handled or stacked on top of each other. Many of the containers themselves had slumped or lost their integrity and strength.

Temporary, tent-like structures were installed on the pad to house the material and to protect it from exposure to the elements. The Pondcrete was analyzed to determine if the Land Disposal Restrictions (LDR) were complied with, indicating that the material was acceptable for disposal. This process resulted in the disposal of approximately 11,200 tn-walls at NTS. The remaining tn-walls are currently in temporary storage onsite and require retreatment prior to ultimate permanent disposal. These tn-wall containers and contents are the primary feed to the proposed Pondcrete/Saltcrete Reprocessing Facility.

Previous Pondcrete Remix Operations

A development project was initiated by EG&G, Rocky Flats, Inc., in 1990 to evaluate the reprocessing (or Remix) of inventory Pondcrete to a certified waste product suitable for permanent disposal. A pilot Pondcrete Reprocessing or Remix Operation was set up in containments located in tents on the 904 Pad Area. Some of the tn-walls in storage were broken down and reprocessed.

Saltcrete

Saltcrete is a waste form that has been produced at the RFP from evaporator salts and saturated brines from the waste water evaporation in the Building 374. Historically, these salts were predominately nitrate salts derived from the waste water solutions from the various sources during the RFP operations. Although the Saltcrete formulations have been shown to reduce the oxidizing potential of the nitrate salts and produce a product suitable for shipping (DOT MTB test RFP-3919), in no cases has the Saltcrete product been deemed certifiable to all transportation and disposal requirements. Thus, it is believed that all inventory Saltcrete must be reprocessed into a certifiable waste form. Saltcrete is stored in both tn-walls and half crate containers on the 904 and 750 pads.

Current Processing Concepts

To the greatest extent possible, the reprocessing of the Saltcrete will utilize the same processing circuit, the same unit operations, and the same handling equipment as the Pondcrete Reprocessing equipment. The process planned for Pondcrete/Saltcrete reprocessing is known as the COMIX process due to the commingling of container and wrapping wastes with the Pondcrete/Saltcrete material being processed. A key feature of the process strategy is to feed the entire wrapped waste form into the circuit for stabilization. The current hopper design is completely enclosed and under negative pressure. A single stage HEPA filtration provides environmental containment. The wrapping and container materials are referred to as "trash" in the processing description.

Water is added to the Pondcrete/Saltcrete blocks to permit wet grinding, wet slurry handling, transport, and to facilitate trash size reduction. The excess water above that required for the stabilization mixture is removed prior to pozzolan mixing and is recycled back to the wet grinding and slurry handling systems and reused.

The estimated schedule for start up and completion for the reprocessing of pondcrete are as follows: construction to start April 1998 and be completed January 1999, testing is to start in January 1999 and completed by April 1999, waste processing is to commence April 1999 and finish reprocessing by December 1999, the dismantling is to start January 2000 and completed in June 2000. Waste reprocessing operation will be conducted on and in close proximity to the 904 pad.

Casting

The reprocessed pondcrete and saltcrete product will be cast into half crates using a pressure pumping system to pump the product slurry to the casting station. The casting station will be covered by a hood system vented through a HEPA filter system.

Separate Processing Facilities

The processing and materials handling systems of the Pondcrete and Saltcrete Reprocessing Facility, currently configured as temporary operations are of modular construction with each unit operation contained within its own stand-alone skid or module. Environmental controls, containment, and filtration systems for any venting are provided on each module. Flow connections between modules have double-containment piping.

SECTION 5

ESTIMATED RADIONUCLIDE EMISSIONS

Appendix D of 40 CFR 61 describes the methods for estimating radionuclide emissions and prescribes adjustment factors based on the physical form of the source material and air effluent pollution controls being used. The emission estimates become input parameters for the AIRDOS-PC computer dispersion model.

The methods of Appendix D were used to derive the emission term on which the dose calculations were based. Possible radiation exposure to the public from pondcrete processing and reprocessing could occur from radioactive particulate matter being released to the atmosphere through single stage HEPA filter on the process equipment and/or the tent-like structure exhaust systems.

The estimated amounts of material to be processed are approximately 3,181,600 kilograms of pond sludge and 4,043,990 kilograms of billets. The pond sludge is in a liquid form while the billets are in a solid particulate form. The evaporation process for water from 207A and B ponds are covered under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Inter-Agency Agreement (IAG). See Appendix A.1 for detailed calculations of potential emission estimates. Tables 3.1 through 3.4 list the Ci per year of the individual constituents that could be potentially released under normal operating conditions.

Table 3.1

**Estimated Radionuclide Emissions
to the Atmosphere from
207C Pondcrete Operations
(Ci/year)**

U-234	U-235	U-238	Pu-238/239/240	Am-241
4.9E-08	2.7E-09	7.5E-08	1.3E-08	1.7E-10

Potential effective dose equivalent (EDE) = 1.51E-06

Table 3.2

**Estimated Radionuclide Emissions
to the Atmosphere from
207A and B Pondcrete Operations
(Ci/year)**

U-234	U-235	U-238	Pu-238/239/240	Am-241
3 2E-10	1 2E-11	3 3E-10	2 7E-11	3 0E-12

Potential EDE = 6 94E-09

Table 3.3

**Estimated Radionuclide Emissions
to the Atmosphere from
Pondcrete Reprocessing Operations
(Ci/year)**

U-234	U-235	U-238	Pu-238/239/240	Am-241
7 9E-06	2 9E-07	9 0E-06	1 6E-04	4 5E-05

Potential EDE = 6 2E-03

Table 3.4

**Estimated Radionuclide Emissions
to the Atmosphere from
Saltcrete Reprocessing Operations
(Ci/year)**

<hr/> Pu-238/39/40 <hr/>	<hr/> Pu-241/42 <hr/>	<hr/> Am-241 <hr/>
7.8E-06	3.4E-08	6.3E-09

Potential EDE = 2.0E-04

Meteorological data from 1991 was used in all the AIRDOS-PC calculations. See Appendix A.2 for the AIRDOS-PC printout of the potential EDE calculations.

Radionuclide Emissions Assessment for Pondcrete Processing

Pond 207A

Mass to be Processed= 5 600 Kilograms
 Note - No sludge samples were available
 water samples were used instead.

<u>Isotope</u>	<u>Concentration</u>		<u>Liquid</u>		<u>Uncontrolled</u>	<u>1 Stage HEPA</u>	<u>Controlled</u>
	<u>(pCi/g)</u>	<u>Total Curies</u>	<u>Emiss. Factor</u>	<u>Emiss. (Ci/y)</u>	<u>Emiss. (Ci/y)</u>	<u>Emiss. Factor</u>	<u>Emiss. (Ci/y)</u>
U-234	3 160E-01	1 770E-06	1 00E-03	1 770E-09	1 00E-02	1 00E-02	1 770E-11
U-235	1 200E-02	6 720E-08	1 00E-03	6 720E-11	1 00E-02	1 00E-02	6 720E-13
U-238	3 460E-01	1 938E 06	1 00E-03	1 938E-09	1 00E-02	1 00E-02	1 938E-11
Pu-239	9 800E-04	5 488E-09	1 00E-03	5 488E-12	1 00E 02	1 00E 02	5 488E-14
Pu-238	2.866E-05	1 605E-10	1 00E-03	1 605E 13	1 00E 02	1 00E 02	1 605E-15
Am-241	6 000E 04	3 360E 09	1 00E-03	3 360E-12	1 00E-02	1 00E-02	3 360E-14
Total Pu		5 648E 09	1 00E-03	5 648E-12	1 00E-02	1 00E-02	5 648E-14

Pond 207B North

Mass to be Processed= 484,000 Kilograms
 Using Composite Sludge Concentrations
 Process water taken to Bldg 910 Evap

<u>Isotope</u>	<u>Concentration</u>		<u>Liquid</u>		<u>Uncontrolled</u>	<u>1 Stage HEPA</u>	<u>Controlled</u>
	<u>(pCi/g)</u>	<u>Total Curies</u>	<u>Emiss. Factor</u>	<u>Emiss. (Ci/y)</u>	<u>Emiss. (Ci/y)</u>	<u>Emiss. Factor</u>	<u>Emiss. (Ci/y)</u>
U-234	1 160E-02	5 614E-06	1 00E-03	5 614E-09	1 00E 02	1 00E 02	5 614E-11
U-235	5 000E 04	2 420E-07	1 00E-03	2 420E-10	1 00E 02	1 00E 02	2 420E-12
U-238	7 500E-03	3 630E-06	1 00E-03	3 630E-09	1 00E-02	1 00E-02	3 630E-11
Pu-239	2.700E-03	1 307E-06	1 00E-03	1 307E-09	1 00E-02	1 00E-02	1 307E-11
Pu-238	7 895E-05	3 821E-08	1 00E-03	3 821E-11	1 00E-02	1 00E-02	3 821E-13
Am-241			1 00E-03		1 00E 02	1 00E 02	
Total Pu		1 345E-06	1 00E-03	1 345E-09	1 00E-02	1 00E-02	1 345E-11

Pond 207B Center

Mass to be Processed= 157,000 Kilograms
 Using Composite Sludge Concentrations
 Process water taken to Bldg 910 Evap

<u>Isotope</u>	<u>Concentration</u>		<u>Liquid</u>		<u>Uncontrolled</u>	<u>1 Stage HEPA</u>	<u>Controlled</u>
	<u>(pCi/g)</u>	<u>Total Curies</u>	<u>Emiss. Factor</u>	<u>Emiss. (Ci/y)</u>	<u>Emiss. (Ci/y)</u>	<u>Emiss. Factor</u>	<u>Emiss. (Ci/y)</u>
U-234	7 200E-02	1 130E-05	1 00E-03	1 130E-08	1 00E-02	1 00E-02	1 130E-10
U-235	2.900E-03	4 553E-07	1 00E-03	4 553E-10	1 00E-02	1 00E-02	4 553E-12
U-238	7 700E-02	1 209E-05	1 00E-03	1.209E-08	1 00E 02	1 00E 02	1 209E-10
Pu-239	6 700E-03	1 052E-06	1 00E 03	1 052E-09	1 00E-02	1 00E-02	1 052E-11
Pu-238	1 959E-04	3 076E 08	1 00E-03	3 076E-11	1 00E-02	1 00E-02	3 076E-13
Am-241			1 00E-03		1 00E-02	1 00E-02	
Total Pu		1 083E 06	1 00E-03	1 083E-09	1 00E 02	1 00E 02	1 083E-11

Pond 207B South

Mass to be Processed= 101 000 Kilograms
 Using Composite Sludge Concentrations
 Process water taken to Bldg 910 Evap

<u>Isotope</u>	<u>Concentration</u>		<u>Liquid</u>		<u>Uncontrolled</u>	<u>1 Stage HEPA</u>	<u>Controlled</u>
	<u>(pCi/g)</u>	<u>Total Curies</u>	<u>Emiss. Factor</u>	<u>Emiss. (Ci/y)</u>	<u>Emiss. (Ci/y)</u>	<u>Emiss. Factor</u>	<u>Emiss. (Ci/y)</u>
U-234	1 270E 01	1 283E 05	1 00E 03	1 283E-08	1 00E 02	1 00E 02	1.283E 10
U-235	4 600E-03	4 646E 07	1 00E 03	4 646E 10	1 00E 02	1 00E 02	4 646E 12
U-238	1 540E 01	1 555E-05	1 00E-03	1 555E-08	1 00E 02	1 00E 02	1 555E 10
Pu-239	2 200E 03	2 222E 07	1 00E 03	2.222E-10	1 00E 02	1 00E 02	2 222E 12
Pu-238	6 433E 05	6 497E 09	1 00E 03	6 497E-12	1 00E 02	1 00E 02	6 497E-14
Am-241	2 900E 03	2 929E 07	1 00E 03	2 929E 10	1 00E 02	1 00E 02	2 929E 12
Total Pu		2 287E 07	1 00E 03	2 287E 10	1 00E 02	1 00E 02	2 287E 12

Totals for Ponds 207A and 207B (N,C,S)

	Uncontrolled	Controlled
<u>Isotope</u>	<u>Emiss. (Ci/y)</u>	<u>Emiss. (Ci/y)</u>
U-234	3.152E-08	3.152E-10
U-235	1.229E-09	1.229E-11
U-238	3.321E-08	3.321E-10
Pu-239	2.586E-09	2.586E-11
Pu-238	7.563E-11	7.563E-13
Am-241	2.963E-10	2.963E-12
Total Pu	2.662E-09	2.662E-11

Pond 207C

Mass to be Processed= 2 434 000 Kilograms
 Using Higher Water Concentrations
 Sludge and Water will be processed together

	Concentration		Liquid	Uncontrolled	1 Stage HEPA	Controlled
<u>Isotope</u>	<u>(pCi/g)</u>	<u>Total Cune</u>	<u>Emiss. Factor</u>	<u>Emiss. (Ci/y)</u>	<u>Emiss. Factor</u>	<u>Emiss. (Ci/y)</u>
U-234	2.027E+00	4.934E-03	1.00E-03	4.934E-06	1.00E-02	4.934E-08
U-235	1.127E-01	2.743E-04	1.00E-03	2.743E-07	1.00E-02	2.743E-09
U-238	3.079E+00	7.494E-03	1.00E-03	7.494E-06	1.00E-02	7.494E-08
Pu-239	5.180E-01	1.261E-03	1.00E-03	1.261E-06	1.00E-02	1.261E-08
Pu-238	1.515E-02	3.687E-05	1.00E-03	3.687E-08	1.00E-02	3.687E-10
Am-241	6.300E-03	1.679E-05	1.00E-03	1.679E-08	1.00E-02	1.679E-10
Total Pu		1.298E-03	1.00E-03	1.298E-06	1.00E-02	1.298E-08

Pondcrete Reprocessing Radionuclide Emission Calculations

904 Pad

No of Trwails to Reprocess =	5 458	Weight of Trwails (Kg) =	2 846 576
No of Half crates to Reprocess =	44	Weight of Half crates (Kg) =	48 889
No of Metal boxes to Reprocess =	200	Weight of Metal Boxes (Kg) =	340,136
		Total =	3 235 601

Isotope	Concentration (pCi/g)	Total Cunes	Solid Particulate Emiss. Factor	Uncontrolled Emiss. (Ci/y)	1 Stage HEPA Emiss. Factor	Controlled Emiss. (Ci/y)
U-234	1 860E+02	6 018E-01	1 00E-03	6 018E-04	1 00E-02	6 018E-06
U-235	7 000E+00	2.265E 02	1 00E-03	2.265E-05	1 00E-02	2 265E-07
U-238	2.090E+02	6 762E 01	1 00E 03	6 762E-04	1 00E-02	6 762E-06
Pu-238	1 340E+02	4 336E 01	1 00E-03	4 336E-04	1 00E-02	4 336E-06
Pu-239	4 575E+03	1 480E+01	1 00E-03	1 480E-02	1 00E-02	1 480E-04
Am-241	1 000E+03	3 236E+00	1 00E-03	3 236E-03	1 00E-02	3.236E-05
				0 000E+00		0 000E+00

750 Pad

No of Trwails to Reprocess =	0	Weight of Trwails (Kg) =	0
No of Half crates to Reprocess =	0	Weight of Half crates (Kg) =	0
No of Metal boxes to Reprocess =	711	Weight of Metal Boxes (Kg) =	1 209 184
		Total =	1 209 184

Isotope	Concentration (pCi/g)	Total Cunes	Solid Particulate Emiss. Factor	Uncontrolled Emiss. (Ci/y)	1 Stage HEPA Emiss. Factor	Controlled Emiss. (Ci/y)
U-234	1 580E+02	1 911E-01	1 00E-03	1 911E-04	1 00E-02	1 911E-06
U-235	5 000E+00	6 046E-03	1 00E-03	6 046E-06	1 00E-02	6 046E-08
U-238	1 830E+02	2 213E-01	1 00E 03	2 213E-04	1 00E-02	2.213E-06
Pu-238	2 700E+01	3 265E 02	1 00E-03	3 265E-05	1 00E-02	3 265E-07
Pu-239	9 120E+02	1 103E+00	1 00E 03	1 103E-03	1 00E-02	1 103E 05
Am-241	1 000E+03	1 209E+00	1 00E-03	1 209E-03	1 00E-02	1 209E-05

Total Emissions 904 & 750		Total Emissions 904 & 750	
Isotope	Controlled (Ci/y)	Isotope	uncontrolled (Ci/y)
U-234	7 929E-06		7 929E-04
U-235	2 870E-07		2.870E-05
U-238	8 975E-06		8 975E-04
Pu-239	4 662E-06		4 662E-04
Pu-238	1 591E-04	Pu-238 & 239 =	1 591E-02
Am-241	4 445E-05		4 445E-03
			Pu-238 & 239 = 1 637E-02

Weights

Approximate weight of Trwail =	521 54 Kg
Approximate weight of Half crate =	1 111 11 Kg
Approximate weight of Metal box =	1 700 68 Kg

Saltcrete Reprocessing Radionuclide Emission Calculations

904 Pad

No of Trwails to Reprocess =	2 313	Weight of Trwails (Kg) =	1 206 327
No of Half crates to Reprocess =	61	Weight of Half crates (Kg) =	67 778
No of Metal boxes to Reprocess =	118	Weight of Metal Boxes (Kg) =	200 680
		Total =	1 474 785

<u>Isotope</u>	<u>Concentration</u> <u>(pCi/g)</u>	<u>Total Cunes</u>	<u>Solid Particulate</u> <u>Emiss. Factor</u>	<u>Uncontrolled</u> <u>Emiss. (Ci/y)</u>	<u>1 Stage HEPA</u> <u>Emiss. Factor</u>	<u>Controlled</u> <u>Emiss. (Ci/y)</u>
Pu-238/39/40	3 085E+02	4 549E-01	1 00E-03	4 549E-04	1 00E-02	4 549E-06
Pu-241/42	1 364E+00	2 012E 03	1 00E-03	2.012E-06	1 00E-02	2 012E-08
Am-241	2 492E 01	3 676E-04	1 00E 03	3 676E 07	1 00E-02	3 676E 09
Total		4 573E 01	1 00E-03	4 573E 04	1 00E-02	4 573E 06

750 Pad

No of Trwails to Reprocess =	0	Weight of Trwails (Kg) =	0
No of Half crates to Reprocess =	850	Weight of Half crates (Kg) =	944,444
No of Metal boxes to Reprocess =	58	Weight of Metal Boxes (Kg) =	98 639
		Total =	1 043 084

<u>Isotope</u>	<u>Concentration</u> <u>(pCi/g)</u>	<u>Total Cunes</u>	<u>Solid Particulate</u> <u>Emiss. Factor</u>	<u>Uncontrolled</u> <u>Emiss. (Ci/y)</u>	<u>1 Stage HEPA</u> <u>Emiss. Factor</u>	<u>Controlled</u> <u>Emiss. (Ci/y)</u>
Pu-238/39/40	3 085E+02	3.217E-01	1 00E-03	3 217E 04	1 00E-02	3 217E-06
Pu-241/42	1 364E+00	1 423E-03	1 00E-03	1 423E-06	1 00E-02	1 423E-08
Am-241	2 492E 01	2 600E-04	1 00E-03	2.600E-07	1 00E-02	2 600E-09
Total		3 234E-01	1 00E-03	3 234E 04	1 00E-02	3 234E-06

<u>Isotope</u>	<u>Total Emissions</u> <u>904 & 750</u> <u>Controlled (Ci/y)</u>	<u>Total Emissions</u> <u>904 & 750</u> <u>uncontrolled (Ci/y)</u>
Pu-238/39/40	7 766E-06	7 766E 04
Pu-241/42	3 434E-08	3 434E 06
Am-241	6 276E-09	6 276E 07
Total	7 807E-06	7 807E 04

Weights

Approximate weight of Trwail =	521 54 Kg
Approximate weight of Half crate =	1 111 11 Kg
Approximate weight of Metal box =	1 700 68 Kg

40 CFR Part 61
National Emission Standards
for Hazardous Air Pollutants

CLEAN AIR ACT COMPLIANCE REPORT
(Version 3.0 November 1989)

Facility: EG&G Rocky Flats, Inc.
Address: P.O. Box 464
 Golden, CO.
Annual Assessment for Year: 1993
Date Submitted 2/ 6/93

Comments: Dose calculation for pondcrete processing
 of ponds 207A&B

Prepared By:

Name: W. E Osborne
Title: Engr
Phone #: (303) 966-8609

Prepared for
U.S. Environmental Protection Agency
Office of Radiation Programs
Washington, D.C. 20460

CLEAN AIR ACT COMPLIANCE REPORT

2/ 6/93 10:52 PM

Facility: EG&G Rocky Flats, Inc.

Address: P.O. Box 464

City: Golden

State: (

Comments: Dose calculation for pondcrete processing of ponds 207A&B

Year: 1993

Dose Equivalent Rates to Nearby Individuals (mrem/year)

Effective
Dose Equivalent

6.94E-09

Highest Organ
Dose is to
LUNGS

4.93E-08

-----EMISSION INFORMATION-----

Radio- nuclide	Class	Amad	Stack #1 (Ci/y)
U-234	Y	1.0	3.1E-10
U-235	Y	1.0	1.2E-11
U-238	Y	1.0	3.3E-10
PU-239	Y	1.0	2.7E-11
AM-241	W	1.0	3.0E-12
Stack Height (m)			10.00
Stack Diameter (m)			0.30
Buoyant (cal/s)			0.0E-01

-----SITE INFORMATION-----

Wind Data	RFONEW91.WND	Temperature (C)	10
Food Source	LOCAL	Rainfall (cm/y)	41
Distance to Individuals (m) :	3942	Lld Height (m)	1405

*NOTE: The results of this computer model are dose estimates.
They are only to be used for the purpose of determining
compliance and reporting per 40 CFR 61.93 and 40 CFR 61.94.

40 CFR Part 61
National Emission Standards
for Hazardous Air Pollutants

CLEAN AIR ACT COMPLIANCE REPORT
(Version 3.0 November 1989)

Facility: EG&G Rocky Flats
Address: P.O. Box 464
 Golden, CO
Annual Assessment for Year: 1993
Date Submitted: 2/ 6/93

Comments: Dose calculation for pondcrete processing
 of pond 270C

Prepared By:

Name: W. E. Osborne
Title: Engr.
Phone #: (303) 966-8609

Prepared for:
U.S. Environmental Protection Agency
Office of Radiation Programs
Washington, D C. 20460

CLEAN AIR ACT COMPLIANCE REPORT

2/ 6/93 11:01 PM

Facility: EG&G Rocky Flats

Address: P.O. Box 464

City: Golden

State

Comments: Dose calculation for pondcrete processing of pond 270C

Year: 1993

Effective Dose Equivalent	Dose Equivalent Rates to Nearby Individuals (mrem/year)	
		1.51E-06
Highest Organ Dose is to LUNGS		1.00E-05

-----EMISSION INFORMATION-----

Radio- nuclide	Class	Amad	Stack #1 (Ci/y)
U-234	Y	1.0	4.9E-08
U-235	Y	1.0	2.7E-09
U-238	Y	1.0	7.5E-08
PU-239	Y	1.0	1.3E-08
AM-241	W	1.0	1.7E-10
Stack Height (m)			10.00
Stack Diameter (m)			0 30
Buoyant (cal/s)			0.0E-01

-----SITE INFORMATION-----

Wind Data	RFONEW91.WND	Temperature (C)	10
Food Source	LOCAL	Rainfall (cm/y)	41
Distance to Individuals (m)	3942	Lid Height (m)	1405

*NOTE: The results of this computer model are dose estimates.
They are only to be used for the purpose of determining
compliance and reporting per 40 CFR 61 93 and 40 CFR 61 94

CLEAN AIR ACT COMPLIANCE REPORT

2/ 6/93 11.05 PM

Facility: EG&G Rocky Flats

Address: P.O. Box 464

City: Golden

State: (

Comments: Dose calculation for pondcrete reprocessing

Year: 1993

Dose Equivalent Rates to Nearby
Individuals (mrem/year)

Effective
Dose Equivalent

0.0062

Highest Organ
Dose is to
ENDOSTEUM

0.0780

-----EMISSION INFORMATION-----

Radio- nuclide	Class	Amad	Stack #1 (Ci/y)
U-234	Y	1.0	7.9E-06
U-235	Y	1.0	2.9E-07
U-238	Y	1.0	9.0E-06
PU-239	Y	1.0	1.6E-04
AM-241	W	1.0	4.5E-05
Stack Height (m)			10.00
Stack Diameter (m)			0.30
Buoyant (cal/s)			0.0E-01

-----SITE INFORMATION-----

Wind Data	RFONEW91.WND	Temperature (C)	10
Food Source	LOCAL	Rainfall (cm/y)	41
Distance to Individuals (m)	3942	Lid Height (m)	1405

*NOTE: The results of this computer model are dose estimates.
They are only to be used for the purpose of determining
compliance and reporting per 40 CFR 61.93 and 40 CFR 61.94.

40 CFR Part 61
National Emission Standards
for Hazardous Air Pollutants

CLEAN AIR ACT COMPLIANCE REPORT
(Version 3.0 November 1989)

Facility: EG&G Rocky Flats
Address: P.O. Box 464
 Golden, CO.
Annual Assessment for Year: 1993
Date Submitted: 2/ 6/93

Comments: Dose calculation for saltcrete reprocessing

Prepared By:

Name: W. E. Osborne
Title: Engr.
Phone #: (303) 966-8609

Prepared for:
U.S. Environmental Protection Agency
Office of Radiation Programs
Washington, D.C. 20460

40 CFR Part 61
National Emission Standards
for Hazardous Air Pollutants

CLEAN AIR ACT COMPLIANCE REPORT
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